

### **Abstract of the Disclosure**

- A field effect transistor (FET) is formed on a silicon on insulator (SOI) substrate in the thin silicon layer above the insulating buried oxide layer. The channel region is lightly doped with a first impurity to increase free carrier conductivity of a first type. The source region and the drain region are heavily dopes with the first impurity. A gate and a back gate are positioned along the side of the channel region and extending from the source region and is implanted with a second semiconductor with an energy gap greater than silicon and is implanted with an impurity to increase free carrier flow of a second type.

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